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# Future Time Perspective and Real-Life Utterances about the Future in Young and Older Adults

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**Abstract**

Future time perspective (FTP) refers to an individual's global perception of the future and has been found to be positively related to life satisfaction. FTP is traditionally assessed via self-report, but recently a few studies have used observable behaviors for assessing FTP. We focused on two real-life behaviors (frequency and qualities of talking about the personal future) and explored whether they could be used as behavior-based measures of FTP. We examined the association between these behaviors and self-reported FTP, and their relations with life satisfaction. The sample included 55 young (aged 18-31) and 47 older adults (aged 62-83). They completed questionnaires on future time perspective and life satisfaction. Over four days, participants carried the Electronically Activated Recorder, which randomly captured 30-second sound snippets from their daily lives. A total of 30'656 sound snippets were collected. Participants' utterances were coded for temporal orientation. Linguistic Inquiry Word Count was used to analyze the qualities of future-oriented utterances. Structural equation models showed that self-reported FTP was not associated with the two real-life behaviors. It was positively associated with life satisfaction for the whole sample. The frequency of future-oriented utterances and family-related words were positively related to young adults' life satisfaction. Achievement-related words were positively related to older adults' life satisfaction.

*Keywords*: Future time perspective; Future-oriented utterances; Life satisfaction; Aging; Electronically Activated Recorder; Linguistic Inquiry Word Count

## Introduction

Life, viewed as having a beginning and an end, is inevitably rooted in the concept of time. Over the past years, growing interest has emerged for understanding how an individual's perception of time influences their lives. Time perspective is broadly defined as the construct underlying an individual's use of the past, present or future to organize the continual flow of their experiences (Zimbardo & Boyd, 1999) and has been described as one of the most influential determinants of human behavior (Boniwell & Zimbardo, 2004). With regards to understanding the effects of time perspective on behavior and how this may be influenced by age, particular interest lies in perspectives related to the future given that it sets the stage upon which an individual may yet act. Future time perspective (FTP) represents an individual's perceptions of the future and his or her remaining time to live (Coudin & Lima, 2011; Rohr, John, Fung, & Lang, 2017). Empirical evidence has emphasized the importance of this construct for shaping an individual's well-being, motivation, and behavior (e.g., Demiray & Bluck, 2014; Kooij, Kanfer, Betts, & Rudolph, 2018), as well as its relations to processes of aging (e.g., Cate & John, 2007; Lang & Carstensen, 2002).

To date, the construct of FTP has been investigated almost exclusively based on traditional self-report methods (e.g., Lu, Li, Fung, Rothermund, & Lang, 2018). Recently, opportunities offered by modern technology have inspired a few researchers to explore novel approaches and attempt to predict FTP from observable behavior (e.g., social media posts; Schwartz et al., 2015). The present study, for the first time, focused on the observable behavior of talking about the personal future: Using a naturalistic observation method in everyday life, namely the Electronically Activated Recorder (EAR; Mehl, Pennebaker, Crow, Dabbs, & Price, 2001), we recorded random snippets of daily conversations of young and older adults over four days. We coded how much (i.e., frequency) and how (i.e., qualities) young and older adults talked about their personal future in daily life. The first goal of the

study was to explore whether these two behaviors could be used as behavior-based measures of FTP. Thus, we examined whether they were associated with FTP as measured by the traditional self-report measure (i.e., Future Time Perspective Scale). That is, we explored whether individuals' subjective and global perception of their future was associated with how much and how they talked about their future. The second goal of the study was to examine the widely studied relation between FTP and life satisfaction (e.g., Seijts, 1998; Simons, Vansteenkiste, Lens, & Lacante, 2004; Zimbardo & Boyd, 1999). We also explored whether our two behavioral measures would show the same relation with life satisfaction. The final goal was to examine all of these associations in young versus older adults, as young adults tend to have a more positive and open-ended FTP than older adults (e.g., Demiray & Bluck, 2014). In sum, we examined whether individuals' global perspective of their future reflects onto their daily language use and how these relate to their life satisfaction.

**Future Time Perspective and Well-Being in the Context of Aging**

One of the most widely used conceptualizations of FTP is that proposed by Carstensen and Lang (1996) describing it as a bipolar dimension extending from perceiving the future as limited to open-ended. Although there has been a recent shift towards a multidimensional operationalization of FTP (for an overview, see Rohr et al., 2017), Carstensen and Lang's (1996) single bipolar dimension remains the most commonly used conceptualization (Brothers, Chui, & Diehl, 2014; Rohr et al., 2017). Rohr and colleagues (2017) proposed that the Future Time Perspective Scale can be reliably implemented for assessing FTP both as a single construct, as well as a multidimensional one, depending on the focus of the research question at hand.

Regarding FTP, one of the most consistently reported interactions is that with chronological age (e.g., Brothers et al., 2014; Cate & John, 2007; Brothers, Gabrian, Wahl, & Diehl, 2016; Coudin & Lima, 2011; Demiray & Bluck, 2014; Grühn, Sharifian, & Chu, 2016;

Lang & Carstensen, 2002). Age accounts for the time from birth till the present, whereas FTP reflects views on the perceived time remaining between the present and the end of life. Thus, the inevitable process of aging is assumed to have inverse effects on these two constructs.

FTP has been associated with psychosocial development (Kruger, Reischl, & Zimmerman, 2008), as well as the formation of personal goals over the lifetime (Carstensen, Isaacowitz & Charles, 1999). For example, the socioemotional selectivity theory (Carstensen et al., 1999) portrays perception of the future and of one's time left to live as a crucial factor for the age-related shift of prioritizing instrumental goals during young adulthood and then emotion regulation ones in later life. According to this theory, selecting goals congruent to one's perceived time left to live plays a key role in determining an individual's well-being and, thus, the natural shifts in FTP present an adaptive mechanism within the context of aging (Lang & Carstensen, 2002).

Nevertheless, Coudin and Lima (2011) oppose this conclusion. They found the relations between goals typical of open-ended FTP and well-being to be positive for adults of all ages, with these benefits being especially pronounced for individuals with limited FTP. Given that limited FTP was also associated with older age, they suggested that open-ended FTP may have positive effects on well-being for individuals of all ages. In fact, a multitude of studies have provided evidence supporting the notion that expanded views of the future are related to positive life outcomes related to well-being (Kooij et al., 2018; Seijts, 1998; Simons et al., 2004; Zimbardo & Boyd, 1999). More specifically, open-ended FTP has been positively related to subjective well-being (Allemand, Hill, Ghaemmaghami, & Martin, 2012; Coudin & Lima, 2011), psychological well-being (Demiray & Bluck, 2014), satisfaction with life (Brothers et al., 2016; Park, et al., 2015; Schwartz et al., 2015) and positive affect (Grühn et al., 2016). On the other hand, negative relations have been found between open-ended FTP

and negative affect (Allemand et al., 2012; Hicks, Trent, Davis, & King, 2012), and depressive symptoms (Grühn et al., 2016).

Considering the relations between FTP and aspects of well-being within the context of aging, the negative association between FTP and age would imply that age-related decreases in FTP are coupled with decreases in well-being. In contrast though, evidence depicts a curvilinear trend for well-being, with it being highest in older age (Ramsey & Gentzler, 2014). Regarding this incongruence, the fact that the majority of the literature on FTP has relied on self-report methods may play a role. In response to this limitation, recently researchers have started to investigate FTP independently of self-reports and to explore behavior-based methods (Park et al., 2015; Schwartz et al., 2015).

**Novel Approaches to FTP Research: Behavioral Data**

The majority of existing studies have assessed FTP based solely on self-report, which comes with a number of limitations. Apart from the classical limitations associated with self-report (i.e., impression management, self-deceptive enhancement, participant awareness, memory biases; Mehl, Robbins & Deters, 2012), experts highlight a few specific weaknesses related to assessing FTP. First, there is a considerable overlap between self-reported FTP and personality trait Conscientiousness (Dunkel & Weber, 2010; Adams & Nettle, 2009; Webley & Nyhus, 2006; Zimbardo & Boyd, 1999), which complicates the distinction between these two constructs (Park et al., 2015; Schwartz et al., 2015). Second, self-reported scales themselves may inherently contribute to age-biases depending on the specific wording of certain items (Brothers et al., 2014). For example, an item such as “Most of my life lies ahead of me” (FTPS; Carstensen & Lang, 1996) might generate different responses from individuals in their twenties compared to those in their seventies simply because of the objective reality of their age, independent of their actual FTP.

Recently, researchers have begun to explore novel approaches to gathering data independently of self-report. Developments in smartphone technology and the advent of the Internet have provided new means for gathering behavioral data in real life settings (e.g., Miller, 2012). Some of these approaches (e.g., mobile sensing; Harari, Müller, Aung, & Rentfrow, 2017) enable collecting data independently of self-report and present three major advantages: They produce objective data, which can be reliably and meaningfully quantified; they are characterized by high ecological validity having been collected in the real world; and given their unobtrusive nature, they extend data collection to subtle and unconscious behaviors otherwise inaccessible to self-report methods (Mehl et al., 2012). One such method is the Electronically Activated Recorder (EAR), a recorder which can be programmed to capture snippets of ambient sounds in real time. The EAR is used to collect objective data of auditory nature, such as one of humans' most powerful social behaviors, namely real-life language (Manson & Robbins, 2017).

Natural language, in the form of everyday conversations, has often been overlooked by researchers given its mundane and apparently unimportant appearance (Duck & Usera, 2014). A number of studies, however, have revealed that language is a relevant source of behavioral data, which can be used to predict individual characteristics, such as age, gender, personality (Boyd & Pennebaker, 2017; Ireland & Mehl, 2014; Park et al. 2015; Pennebaker & Stone, 2003; Schwartz et al. 2013) and recently, time perspective (Park et al., 2015; Schwartz et al., 2015). Park and colleagues (2015) used written linguistic data in the form of Twitter and Facebook postings to assess an individual's time perspective (i.e., past, present, future) and its relation to age, personality, life satisfaction and depression. Based on the temporal orientation ratings of three independent judges, they developed an automated temporal classification model. Findings showed open-ended FTP to be positively related to age and life satisfaction, and negatively to depression. The authors concluded that their

innovative methodological approach largely supported and replicated the literature on time perspective, suggesting that behavioral data are appropriate means for investigating this construct.

Although Park and colleagues' (2015) novel method and findings are exciting, two limitations of the study are worth addressing. First, they have not used any other temporal orientation measures (e.g., self-report) to ensure that their novel method measures the same underlying construct as existing measures. Hence, it is not clear whether their future orientation measure assesses FTP. This might explain why they found open-ended FTP to be positively related to age, which is inconsistent with the negative relation reported in the FTP literature (e.g., Lang & Carstensen, 2002). This finding could also be related to the narrow age range of their sample (i.e., 13 - 48 years) given that FTP becomes predominantly associated with limitations after the age of 60 (Strough, de Bruin, Parker, Lemaster, Pichayayothin, & Delaney, 2016). Second, although data from social network sites are easily accessible and abundant, according to Walther (2007), computer-based communication "differs substantially from face-to-face communication, in form if not in function" (p. 2539) and that the "time spent in computer-based communication prompts especially mindful and deliberative message composition" (p. 2543).

**The Current Study**

Similar to Park and colleagues' (2015) approach, we investigated FTP in relation to a language-based, objective behavior in real-life settings. However, our study had three advantages compared to Park and colleagues' design (2015): We included a self-report measure of FTP in our study; included not only young individuals, but also older adults in our sample; and focused on naturalistic conversations rather than computer-based language. We examined language in the form of everyday utterances using a naturalistic observation method, the EAR. Seijts (1998) claimed that perceiving the future as expansive leads

individuals to be more involved in the future, to think more about it and to act more upon it. Thus, theoretically, FTP might be consistently traceable in an individual's natural language use. Everyday conversations with others are one of our prominent means for interacting with the social world in which we live and develop, as well as playing a role in maintaining our self-concepts (Pasupathi, Mansfield, & Weeks, 2014). The relationship between FTP and daily talking behavior has not, yet, been investigated and this relation could provide a deeper insight into another way in which FTP affects our daily life.

The first goal of the study was to explore whether the frequency and qualities of future-oriented utterances could be used as behavior-based measures of FTP. Thus, we examined whether they were associated with FTP as measured by the traditional self-report measure (i.e., Future Time Perspective Scale). The second goal, based on the literature reporting a positive relation between open-ended FTP and life satisfaction, was to investigate the relations of the three measures with life satisfaction. Finally, the third goal of the study was to consider these within the context of aging and compare relations for young and older adults. All investigated associations are depicted in our conceptual model in Figure 1.

We assessed a naturally-occurring future-oriented behavior, namely that of talking about one's future in daily life. We investigated two aspects of future-oriented utterances: A quantitative measure of frequency and a qualitative one reflecting *how* people talk about their future. With regards to our quantitative measure, we expected the frequency of future-oriented utterances to be positively related to self-reported FTP. Based on the negative relation between age and FTP (e.g., Grühn et al., 2016; Lang & Carstensen, 2002), we expected that young adults would talk more frequently about their personal future compared to older adults. On the other hand, considering open-ended FTP to be positively associated with life satisfaction (e.g., Park et al., 2015), regardless of age (e.g., Demiray & Bluck,

2014), we expected positive relations between the frequency of future-oriented utterances and life satisfaction for both young and older adults.

Considering our qualitative measure, we used the Linguistic Inquiry and Word Count (LIWC; Meier, Boyd, Pennebaker, Mehl, Martin, Wolf, & Horn, 2018; Pennebaker & Francis, 1999) to analyze the patterns of specific word category use in future-oriented utterances. Based on the socioemotional selectivity theory (Carstensen et al., 1999), we focused on qualities of future-oriented utterances related to emotions (i.e., use of positive and negative emotion words), close social relationships (i.e., words related to family and friends), and drives (i.e., words related to affiliation and achievement). Although there is a vast literature on how individuals perceive their future (Lang & Damm, 2017), to date no study has investigated how people talk about their future in everyday life. Thus, we openly explored the relations of the six qualities of future-oriented utterances for young and older adults. We explored whether, for example, there was a positive relation between the number of positive emotion words in future-oriented utterances and life satisfaction (in contrast to a negative relation between the number of negative emotion words in future-oriented utterances and life satisfaction).

## Methods

### Participants

This study is part of a larger project, which recruited and collected real-life sound snippets of 111 healthy (Swiss) German-speaking young and older participants. Participants were recruited through the participant pool of the Department of Psychology at the University of Zurich, via flyers, or through advertisements on websites and in local newspapers. An inclusion criterion for older adults was a minimum score of 27 on the Mini Mental State Examination (MMSE; Folstein, Folstein, & McHugh, 1975). Nine participants were excluded due to inadequate data: Seven had missing questionnaires and two spoke predominantly a

foreign language. Thus, the final sample, described in Table 1 was composed of 102 adults, split into two age groups: young adults (18-31 years) and older adults (62-83 years).

## Procedure

**Introductory session.** Before the four days of audio recording, participants met with the research team and received instructions on the study, as well as completing a package of questionnaires including measures of demographics and future time perspective. They also received their assigned iPhone and charging cable. Participants were informed that the iPhones were set to "Airplane mode" and locked with only the EAR application running, thus functioning solely as a recorder which at random times and beyond their awareness would record 30-second snippets of their daily lives. They were instructed to carry the iPhone with them as much as possible over the next four days.

**The EAR.** We used the iPhone app "EAR 2.0" (Mehl, 2014). The EAR was programmed to automatically record 30-second snippets of daily life at random times (on average four times per hour) between 6 am and midnight over the span of four days (two weekdays and one weekend, counterbalanced). Participants were instructed to carry the iPhone with them as much as possible during the day, either attached to a belt or in their pocket, and to charge it every night. Participants were also asked to fill out daily end-of-the-day diaries for the four days reporting a general overview of their main activities (e.g., eating, studying, spending time with friends) and when each activity occurred.

**Feedback session.** After the four days of recording, participants again met with the research team and completed further questionnaires including one assessing their life satisfaction. They also evaluated the EAR method on a 10-item questionnaire. Documentation of method acceptance and compliance, as well as dropout rate is available at https://osf.io/yd6qu/. Participants were also given the opportunity to listen and delete any of their sound files that they desired to exclude from the study. Finally, they received a CD

containing all of their sound files and were compensated with either 50 Swiss Francs or, in the case of university students, with course credit.

**Measures**

Self-report measures were administered before (T1) and after (T2) audio data collection. For this study, we investigated future time perspective assessed at T1 and life satisfaction at T2 in line with the order in our conceptual model.

**Future Time Perspective.** Participants' subjective perception of their future was assessed using the German version of Lang and Carstensen's *Future Time Perspective Scale* (FTPS; 1996). This scale is composed of 10 items each rated on a 7-point Likert scale. FTPS had a high reliability, Cronbach's $\alpha = .91$.

**Life Satisfaction.** Life satisfaction was assessed using the Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen & Griffin, 1985; German translation from Schumacher, 2003). The five items of the SWLS were rated on a scale from 1 (*do not agree at all*) to 7 (*fully agree*) and had an internal consistency of Cronbach's $\alpha = .83$.

**Behavioral measures.** All sound files were listened to and coded (by two coders) for whether the participant was talking or not. Files containing participant's speech were transcribed and coded for temporal orientation (mean inter-rater reliability: 85%). To protect the privacy of others, transcription and coding focused solely on participants' utterances, without including those of other social partners. Temporal orientation coding included a reference to time (i.e., talking about the past, present, and/or future) and to person (i.e., talking about one's self or others; see Demiray, Mehl, & Martin, 2018 for a description of the coding scheme). *Personal future* referred to anything that will/might or will/might not happen in one's future (e.g., "We will not go to the movies tomorrow", "I have to work on Saturday"). All coding categories were dichotomous, indicating presence (1) or absence (0) of a temporal orientation.

***Frequency of future-oriented utterances.*** The frequency of future-oriented utterances was calculated for each participant by dividing the number of their personal future-oriented utterances by the total sum of their temporally-oriented utterances (i.e., utterances about both personal and others' past, present and future).

***Qualities of future-oriented utterances.*** The qualities of utterances were analyzed using the newest German version of the text analysis program DE-LIWC15 (Meier et al., 2018). This program comprises 18'711 words which are mapped into over 80 dictionary categories (Meier et al., 2018). Using automated word count analysis, the program permits analyzing use of words related to a specific category (e.g., emotions) from written language or transcribed speech. The qualities of personal future-oriented utterances of each participant were investigated by merging only those sound files containing references to the personal future into a single file and analyzing the frequency of the following six word categories: Positive emotions (e.g., happy), negative emotions (e.g., offended), family (e.g., dad), friends (e.g., friendship), affiliation (e.g., relationship), and achievement (e.g., success).

**Analytical Approach**

The conceptual model is presented in Figure 1 and was analyzed using structural equation modeling (SEM). We used the R package *lavaan* (Rosseel, 2012) using R Language, version 1.0.136 (RStudio Team, 2016). Confirmatory factor analysis (CFA) was conducted and modification indices which made theoretical sense within the framework of the model were adopted to fit the model. Given that this study investigated the structure of the relations between variables across young and older adults, it was not necessary to apply constraints of measurement invariance (otherwise necessary to enable multi-group comparison of variable means; Borsboom, 2006). Model fits were evaluated based on the indices and respective cut-off criteria: Chi-square ($X^2$) test statistic with its degrees of freedom and *p*-value; the Bentler Comparative Fit Index (CFI) considering > .90 and > .95 as

cut-offs for "acceptable" and "good" fit, respectively (McDonald & Ho, 2002); the Steiger-Lind root mean square error of approximation (RMSEA) with values close to or less than .08 and a confidence interval of .05 – .10 indicating "acceptable" fit (McDonald & Ho, 2002); and given our small sample size ($N < 150$), the Standardized Root Mean Square Residual (SRMR) with a cut-off value close to .08 for "good" fit (Hu & Bentler, 1999). Nevertheless, given the sensitivity and complexity of SEM models, in some cases models with less adequate fits may be retained when these decisions could be justified (Ockey & Choi; 2015) and in the case of our small sample size ($N < 150$), less rigorous cut-offs are required for retaining all correct models and rejecting incorrect ones (Sivo, Fan, Witta, & Willse, 2006).

## Results

### Preliminary Analyses

Over the span of four days, the EAR captured a total of 30'656 sound files (for further details on sound file deletions, see https://osf.io/yd6qu/). For young adults, 3'442 sound files (18.6% of young adults' sample) containing speech were collected ($M = 62.58$, $SD = 31.90$), whereas for older adults the total was 2'583 files (21.2% of older adults' sample; $M = 54.96$, $SD = 31.29$). An independent samples $t$ test revealed this difference to be non-significant, $t(100) = 1.21$, $p = .23$, suggesting that the frequency of talking in general was equal across the two age groups. Subsequent analyses were conducted on only those sound files containing personal future-oriented utterances, which for young adults resulted in a sample of 431 sound files (8.7% of all young participants' utterances) and 298 (5.1% of all utterances) for older adults.

Table 2 presents an overview of correlations, descriptive statistics and tests of mean differences for young and older adults. After computing the means of the frequency of future-oriented utterances for young and older adults (Table 2), an $F$ test revealed the two age groups to have unequal variances $F(54, 46) = 2.50$, $p = .002$. Thus, we proceeded to using

Welch's two samples *t* tests to investigate the mean differences between the two age groups (Table 2). Consistent with the literature on FTP (e.g., Grühn et al., 2016; Lang & Carstensen, 2002) and our expectations, we found that young adults had significantly higher FTP scores than older adults (Table 2). Results showed that, on average, young adults talked significantly more frequently about their future than older adults (Table 2). With regards to life satisfaction, results showed an opposite trend with older adults scoring higher on life satisfaction compared to their younger counterparts, but this difference did not reach significance (Table 2). Finally, while talking about their personal future, young adults mentioned friends more than older adults did (Table 2).

**Major Analyses**

Given the limitation of our small sample size for testing models with greater numbers of variables, we opted for parsimonious models and tested seven variations of the conceptual model (Figure 1): One including only FTP and frequency of future-oriented utterances (Model 0), and thereafter six models including a different LIWC variable (i.e., words related to positive emotions, negative emotions, family, friends, affiliation, and achievement; Models 1-6). Tables 3 and 4 display SEM regression coefficients for the predictors and the fits for each model, respectively.

In line with our first research goal, we first examined the relations between self-reported FTP and the two behavior-based measures. We tested whether the frequency of future-oriented utterances was positively related to FTP, and examined the covariance between these two variables in Model 0. Although the fit of the model was acceptable (Table 4), FTP and the frequency of future-oriented utterances emerged as unrelated for both young ($\beta = .061$, $p = .667$) and older adults ($\beta = .095$, $p = .505$). For the sake of parsimony, we subsequently dropped this relation from Models 1- 6.

Next, we examined whether self-reported FTP and the six qualities of future-oriented utterances (as measured by LIWC) were associated (Table 3). No relations emerged between self-reported FTP and the qualities of future-oriented utterances for neither young nor older adults. Considering the relations between our two behavior-based measures, only for young adults, did we find significant relations: Words related to positive emotions, affiliation and achievement were positively related to the frequency of future-oriented utterances.

In line with our second and third research goals, we investigated the associations of FTP and the two behavior-based measures to life satisfaction, and we did so for both young and older adults.[1] We found that although FTP was positively related to life satisfaction in both age groups, the frequency of future-oriented utterances was significantly related to life satisfaction only amongst young adults (Table 3). With regards to the qualities of future-oriented utterances, only two of the six LIWC variables emerged as related to life satisfaction (Table 3). For young adults, only the number of words related to family was positively associated with life satisfaction ($\beta = .19$, $p = .01$). For older adults, the number of words related to achievement had a marginally significant effect and was positively associated with life satisfaction ($\beta = .23$, $p = .09$).

Finally, we tested an additional model in order to check the robustness of our findings. We tested a single model with only the four predictors that showed significant effects above (i.e., FTP, frequency of future-oriented utterances, Family and Achievement; Appendix, Table 1). Our results were replicated, however, given the increased complexity of the model with respect to our sample size, the fit was inferior to our original models. The fact that our results were replicated shows the robustness of our original findings.

## Discussion

The three goals of the current study were to explore the relationship of the traditional self-report measure of FTP with two real-life behaviors (i.e., frequency and qualities of

utterances related to one's personal future); to examine whether these three measures showed consistent relations with life satisfaction; and to examine all these associations within the context of aging, considering relations for young and older adults.

Four main findings emerged from this study. First, self-reported FTP was not related to the frequency or the qualities of future-oriented utterances for neither young nor older adults. Second, self-reported FTP was consistently and positively related to life satisfaction for both young and older adults. Third, the frequency of future-oriented utterances was also positively related to life satisfaction, but only for young adults. Finally, age group differences emerged for the qualities of future-oriented utterances, with words related to family being positively associated with young adults' life satisfaction, whereas words of achievement being relevant for older adults' life satisfaction.

Considering our first goal of relating FTPS scores with the two real-life behaviors, neither frequency of future-oriented utterances nor any of the six linguistic categories representing qualities of these utterances showed any relation to FTP. In other words, the frequency with which adults (both young and old) talk about their future and how they talk about it is not related to how they subjectively perceive their future. These findings lead us to question those of Park and colleagues (2015) and the validity of assessing FTP from verbal behavior. Nevertheless, a couple of points are worth noting: Although self-reported FTP and aspects of talking about the future were not directly related to each other, the frequency of future-oriented utterances showed the typical negative relation with age consistently found with self-reported FTP, supporting the idea of a shared underlying construct. Furthermore, Lang and Damm (2017) emphasize how the use of spatial analogies, such as extension, for representing FTP have notable shortcomings given that they are based on the assumption that subjective perception adheres to the laws of physical space. Thus, future research is needed to shed more light on the possibility that behavior-based measures may reflect aspects of FTP

not captured by self-report and consider the potential of multi-method approaches for studying the same phenomenon from different perspectives.

Another explanation may be that future-oriented thinking might be happening mostly privately (in people's minds) rather than socially in conversations. Previous experience-sampling studies show that individuals tend to *think* much more about their future than their past in real life (i.e., prospective bias; D'Argembeau, Renaud, & Van der Linden, 2011; Felsman, Verduyn, Ayduk, & Kross, 2017; Rasmussen & Berntsen, 2011). In contrast, Demiray and colleagues (Demiray, Mehl & Martin, 2018) have found a retrospective bias in real-life conversations showing that individuals talk about their past two to three times as much as their future. Thus, one's general view of their future (as measured by the FTPS) may be more likely to be reflected onto their momentary thoughts rather than onto their conversations. Future research should use the experience-sampling method in addition to the FTPS to examine whether individuals with more positive and open-ended FTP also tend to *think* more frequently about their future (and with different qualities) in everyday life.

The second goal of the study, based on the widely observed positive relation between FTP and life satisfaction, was to replicate this finding, as well as exploring the relations of the two real-life behaviors with life satisfaction. Consistent with the literature, self-reported FTP was positively related to life satisfaction independent of age (e.g., Demiray & Bluck, 2014). However, the relation was stronger for older adults than young adults. The reason might be that self-reported FTP was the major predictor of life satisfaction for older adults, but for young adults, the frequency of future-oriented utterances was also influential. That is, only for young adults, the frequency of future-oriented utterances mirrored the positive relation of self-reported FTP with life satisfaction: Young adults who talked more about their future were also more satisfied with life, but this relation did not exist for older adults. Why could this be? Considering self-reported FTP, it is not difficult to imagine why believing that

one has longer to live might have positive effects on life satisfaction, as is consistently found in the literature (e.g., Brothers et al., 2016). On the other hand, in older adulthood, the literature describes a human tendency to gradually become more apprehensive in evaluating the future (Shmotkin, 1992), as well as an increasing strive for a sense of self-continuity through time, resulting in older adults perceiving their future selves as a continuous part of their present selves (Rutt & Löckenhoff, 2016). These tendencies might lead to older adults not only talking less directly about their future, but also to assimilating perceptions and significance of this time frame into the views of their continuous present self. In fact, the literature describes cognitive strategies considered adaptive for successful aging including extending the time frame of one's present-self and devaluing the future as to emphasize savoring the present (Lang & Damm, 2017). In older age, the relevance of the future may have become integrated into views of the present, which might explain why future-oriented utterances may be less relevant for their life satisfaction. In fact, the present has been found to be positively related to life satisfaction in older age (Lennings, 2000). This is in line with the socioemotional selectivity theory (Carstensen, Isaacowitz & Charles, 1999), which suggests that older adults have more emotion-oriented goals, which can be realized in the present through focusing on positive experiences and reaching achievable goals.

In contrast, young adults who tend to perceive their future as almost limitless in terms of time and opportunities, seem to talk more overtly about their future, which is positively associated with their life satisfaction. Young adults emphasize knowledge-oriented goals, focus on gathering as much information about the world as possible and on pursuing activities that will pay off in the future (Carstensen, et al., 1999). In line with these goals, they may be actively planning and making decisions about their activities, career or relationships, while talking to others in real life (Ciairano, Rabaglietti, Roggero, & Callari, 2010). Young adults of the same culture share (and thus potentially talk about) a number of

common life events they expect to occur in the present or near future, which creates a common conversational ground. By discussing one's future plans and goals with others, a young person may gain insightful information or learn from the experiences of others. Thus, overtly talking about the future may give them a sense of control, potentially reduce anxiety and shine a bright light upon prospects of future success, which in turn could contribute positively to life satisfaction.

Considering the qualities of future-oriented utterances and their relations with life satisfaction, further age group differences emerged. For young adults, using more words related to family emerged as positively related to life satisfaction, whereas for older adults, achievement-related words showed significant importance. One explanation for young adults might be that more references to family reflect stronger familiar relationships, more frequent contact, as well as foreseeing the permanence of these relationships in the future. Parental attachment has been positively linked to life satisfaction in young adults (Guarnieri, Smorti, & Tani, 2015). Furthermore, Lambert and his colleagues (2010) found family relations and their support to be highly important for determining the sense of meaning in life for young adults. Other studies have found positive effects of close family ties on the self-esteem of young adults (e.g., Roberts & Bengston, 1996). Considering young adulthood as a unique stage of development characterized by a focus on achieving intimacy rather than social isolation (Erikson, 1950), family could provide a secure and meaningful base upon which to rely during the phase of exploration and identity formation, thus contributing to being satisfied with life.

A second and not mutually exclusive explanation could reside in the concept of life scripts (Berntsen & Rubin, 2002; Rubin & Berntsen, 2003). Life scripts are culturally shared prototypical life events which contribute to forming expectations about the future, as well as the approximate ages at which these events typically occur. Accordingly, a number of major

family-related events fall within the years of young adulthood (e.g., finding a long-term partner, marriage, childbirth). Although it is acknowledged that life scripts do not represent the average life, people tend to consider events occurring "on time" positively (Rubin & Berntsen, 2003), whereas "off-time" occurrences are associated with stigma and stress (Neugarten & Hagestad, 1976). Thus, it would be plausible to assume that for young adults nearing or falling within the age range of these events, fantasizing, being en route or actually being in the midst of these events would not only color their conversations regarding their future, but would also contribute to their life satisfaction.

This point of life scripts finds further support given that family-related words cease to have positive relations for older adults. No family-related events are to be expected in the age range of our old group. This is somewhat surprising considering that the socioemotional selectivity theory (Carstensen, et al., 1999) describes prioritizing close relationships (i.e., family) which satisfy one's emotional needs in older age. Findings here indicated that older adults did not refer to family less frequently than young adults, but rather that this frequency was unrelated to their life satisfaction. This may suggest that although older adults highly value the support of their family members, in old age, milestones related to family have been achieved and no longer represent personal future goals towards which to strive for maintaining satisfaction with life.

In contrast, the use of words related to achievement in older adults' future-oriented utterances was associated with life satisfaction. This is of particular interest given that, although how frequently older adults talked about their future was not linked to their life satisfaction, using more achievement-related words in these utterances was. Why achievement references bare a particular relevance for older adults might be explained by the nature of aging itself. Havighurst (1972) described dealing with losses and adjusting to changes in one's physical, cognitive, social and professional life comprise major

developmental tasks of old age. Successful aging entails overcoming these hurdles and is defined by the maintenance of functional capacities and active engagement with life (Rowe & Kahn, 1997). Studies have found successful aging to be associated with positive outlooks on life, strong feelings of self-efficacy, sense of control, autonomy, independence, as well as effective coping strategies to deal with age-related losses (Bowling & Dieppe, 2005; Erikson, 1950). All of these factors may not only determine older adults' successful aging in the present, but may also enhance their trust in their abilities, thus enable envisioning future achievements. From this perspective, talking about future achievements could potentially be an indicator of present successful aging, reflected in greater life satisfaction of older adults who make more references to future achievements.

**Limitations and Future Research**

One limitation of the present study was the small sample size. Especially for conducting SEMs, the commonly recognized rule of thumb suggests a ratio between sample size and estimated parameters of 20:1 (Kline, 2011). Nevertheless, even with our sample, our SEM models achieved acceptable fits, thus we justified interpreting our results. One strength of the study was the big size of our real-life data: We collected thousands of sound snippets from our participants, which provided us with robust data on their everyday language use.

Another limitation was that we did not have a middle-aged group in our study. Based on the documented age-related shift in time perspective occurring during midlife (e.g., Cate & John, 2007), it would be interesting to observe the frequency of talking about the future and the qualities of future-oriented utterances during this period of life.

We did not find any relations between self-reported FTP and the two real-life behaviors on talking about the future. Although past research showed that language is a good proxy for indirectly studying FTP, our language-based measures were unrelated to how individuals subjectively perceived their future. Future research should use a multi-method

approach with other real-life methods (e.g., experience-sampling in addition to the EAR) to examine how much, how and why people think and talk about their future in everyday life to create more ecologically valid measures of FTP.

With regards to the qualities of speech, we limited our exploration to a selection of six word categories based on the socioemotional selectivity theory (Carstensen et al., 1999) and our approach was completely exploratory. The newest version of LIWC contains over 80 word categories, including those related to biological processes, perceptual processes, or personal concerns. Future research might investigate these to shed more light on further functions of talking about the future.

## Conclusions

Future time perspective has been widely studied in the literature in relation to healthy aging. However, past work is dominated by findings based on self-report. In this work, we explored whether FTP is associated with an objective and real-life verbal behavior, namely talking about the personal future. Although this behavior was unrelated to general subjective views of the future, it was still associated with young and older adults' life satisfaction. Young adults' life satisfaction was predicted by both their subjective perception of the future, and by how much they talked about the future and used family-related words. For older adults, however, the most important predictor of life satisfaction was their subjective view of the future, followed by how much they used achievement-related words while talking about the future. This shows that for older adults, it is not how much they *talk* about their future in everyday life, but how they *think* about their future that matters. This suggests that self-report may be a more suitable method to assess older adults' future time perspective, whereas young adults' future time perspective may be more diversely represented in different behaviors (e.g., thinking and talking) and suitable to be measured in alternative ways.

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## Footnotes

[1] Life satisfaction was assessed both at T1 and T2. A paired Mann Whitney U test showed that young adults had significantly higher life satisfaction at T2 (*Median* = 5.4) compared to T1 (*Median* = 5.2), $Z = -2.31$, $p = .02$. For older adults, no significant difference emerged (T1: *Median* = 5.2; T2: *Median* = 5.3), $Z = -0.42$, $p = .68$. Thus, for young adults, the relations of FTP and talking behavior to T1 and T2 life satisfaction were examined separately. All predictor variables showed consistent relations to life satisfaction at T1 and T2 (standardized betas for T1 given here; see Table 3 for T2): FTP ($\beta = .29$, $p = .03$), frequency of future-related utterances ($\beta = .34$, $p = .05$), positive emotion words ($\beta = .01$, $p = .96$), negative emotion words ($\beta = -.04$, $p = .72$), family words ($\beta = .22$, $p = .09$), friends words ($\beta = .05$, $p = .69$), affiliation words ($\beta = .04$, $p = .61$), achievement words ($\beta = .09$, $p = .56$). Given that the difference between T1 and T2 life satisfaction did not affect the patterns of relations between variables, following the temporal logic of our conceptual model, we reported life satisfaction assessed at T2 (following FTP at T1 and real-life talking behavior between T1 and T2).

Table 1

*Demographic Information*

| | Young adults | Older adults |
|---|---|---|
| *N* | 55 | 47 |
| Age (years; *M* (*SD*)) | 23.0 (3.0) | 70.6 (4.7) |
| Gender | 37 Women (67.3%) | 25 Women (53.2%) |
| Marital status | | |
| Single | 44 (80%) | 9 (19.1%) |
| Married | | 27 (57.4%) |
| Long-term partnership | 10 (18.2%) | 2 (4.3%) |
| Divorced | | 5 (10.6%) |
| Widowed | | 3 (6.4%) |
| Highest level of education | | |
| Mandatory schooling | 2 (3.6%) | 5 (10.6%) |
| Apprenticeship | 4 (7.3%) | 15 (31.3%) |
| High school | 29 (52.7%) | 10 (21.3%) |
| Trade school | 8 (14.5%) | 3 (6.4%) |
| Technical school | | 5 (10.6%) |
| University, higher technical school | 9 (16.4%) | 9 (19.1%) |
| Occupational status | | |
| Retired | | 42 (89.4%) |
| Student | 44 (80.0%) | |
| Apprentice | 1 (1.8%) | |
| Unemployed | 2 (3.6%) | |
| Part-time employment | 4 (7.3%) | 3 (6.4%) |
| Full-time employment | 2 (3.6%) | 1 (2.1%) |

*Note*. Demographic information was incomplete for some participants, but missing data were not reported in the table. Regardless, the percentages are based on total sample sizes indicated in the first row of the table.

Table 2

*Correlations, Descriptive Statistics and Mean Comparisons for Young and Older Adults*

| Measure | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* | *M (SD)* | *t* test |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. FTP | – | .07 | .36** | -.09 | .05 | .04 | .21 | .15 | -.18 | 5.10 (.89) | 8.51*** |
| 2. SWL | . 54*** | – | .38** | -.05 | -.04 | .35** | .32* | .19 | 0 | 5.05 (1.11) | -.98 |
| 3. F. Utt | .06 | -.04 | – | .42** | .26* | .32* | .33** | .38 ** | .53*** | 7.96 (4.86) | 4.10*** |
| 4. PosEmo | -.09 | -.14 | .30* | – | .03 | .17 | .02 | .30* | .45*** | 3.61 (3.40) | .50 |
| 5. NegEmo | .20 | .27 | -.15 | .02 | – | .28* | .20 | .09 | .14 | .71 (1.42) | 1.16 |
| 6. Family | .05 | .20 | .17 | .13 | .43** | – | .23 | .16 | .28* | .24 (.52) | -.62 |
| 7. Friends | -.14 | .14 | .04 | .04 | .11 | .50*** | – | .13 | .07 | .15 (.37) | 2.22* |
| 8. Affil. | .03 | -.08 | .02 | .13 | .18 | .41** | .18 | – | .48*** | 2.10 (2.06) | -.09 |
| 9. Achiev. | -.15 | .22 | .29* | .17 | .17 | .26 | .09 | .13 | – | 1.93 (1.49) | .02 |
| *M (SD)* | 3.37 | 5.25 | 4.71 | 3.22 | .44 | .34 | .03 | 2.15 | 1.92 | | |
| | (1.12) | (.86) | (3.07) | (4.19) | (.99) | (1.07) | (.12) | (2.56) | (1.40) | | |

*Note*. Spearman correlations of variables for young participants ($n$ = 55) are presented above the diagonal; correlations for older participants ($n$ = 47) are presented below the diagonal. Means ($M$) and standard deviations ($SD$) for young adults are presented in the vertical columns; means and standard deviations for older adults are presented in the horizontal rows. The final column presents Welch's two sample $t$ tests of age group differences in variable means. FTP = Future time perspective; F. Utt = frequency of future-oriented utterances; SWL = Satisfaction with life. Variables 4-9 represent LIWC categories: percentage of word category usage in participant's personal future-oriented utterances. PosEmo = positive emotion; NegEmo = negative emotions; Affil. = affiliation; Achiev. = achievement. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 3

*Results of Seven Structural Equation Models Predicting Life Satisfaction*

| Model | Model 0 | | Model 1 | | Model 2 | | Model 3 | | Model 4 | | Model 5 | | Model 6 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Label | | | PosEmo | | NegEmo | | Family | | Friends | | Affiliation | | Achievement | |
| | Young | Old | Young | Old | Young | Old | Young | Old | Young | Old | Young | Old | Young | Old |
| SWL | | | | | | | | | | | | | | |
| <- FTP | .357** | .580*** | .333** | .567*** | .359** | .577*** | .379** | .578*** | .355** | .575*** | .357** | .588*** | .344** | .613*** |
| <- F. Utt | .380** | -.087 | .443*** | -.058 | .386*** | -.083 | .362** | -.090 | .379*** | -.081 | .379*** | -.119 | .466*** | -.143 |
| <- LIWC | – | – | -.157 | -.108 | -.033 | .008 | .185** | .062 | .058 | -.016 | .020 | -.267 | -.156 | .233° |
| FTP <-> | | | | | | | | | | | | | | |
| LIWC | _ | _ | -.159 | -.099 | -.003 | .044 | -.109 | -.001 | .079 | -.124 | .094 | .045 | -.097 | -.149 |
| F. Utt <-> | | | | | | | | | | | | | | |
| LIWC | _ | _ | .367** | .264 | .020 | -.134 | .122 | .122 | .116 | .131 | .289* | -.157 | .517*** | .267 |

*Note*. Standardized beta coefficients for the six models are reported. The first column lists the predictors. FTP = Future time perspective; F. Utt = frequency of future-oriented utterances; SWL = Satisfaction with life. Models 1-6 consider a different LIWC variable, which is indicated by the model label. PosEmo = positive emotions. NegEmo = negative emotions. * $p < .05$. ** $p < .01$. *** $p < .001$. ° $p = .09$.

Table 4

*Fit Indices of the Seven Models Predicting Life Satisfaction*

| Model label | $X^2(df)$ | CFI | RMSEA [90%-CI] | SRMR |
|---|---|---|---|---|
| Model 0 | 243.7 (192) | .930 | .073 [.042, .098] | .086 |
| Model 1 – PosEmo | 279.2 (220) | .924 | .073 [.044, .096] | .087 |
| Model 2 – NegEmo | 270.2 (220) | .933 | .067 [.035, .092] | .086 |
| Model 3 – Family | 284.1 (220) | .918 | .076 [.048, .099] | .088 |
| Model 4 – Friends | 276.6 (220) | .924 | .071 [.041, .095] | .088 |
| Model 5 – Affiliation | 280.3 (220) | .920 | .074 [.045, .097] | .088 |
| Model 6 – Achievement | 285.8 (220) | .916 | .077 [.050, .100] | .089 |

*Note*. $N = 102$. Each model considers a different LIWC variable which is indicated by the model label. Model 0 only includes FTP and frequency of future-oriented utterances as predictors; it does not include any LIWC variables. PosEmo = positive emotion. NegEmo = negative emotion. CFI = comparative fit index. RMSEA = root mean square error of approximation. SRMR = standardized root mean residual.

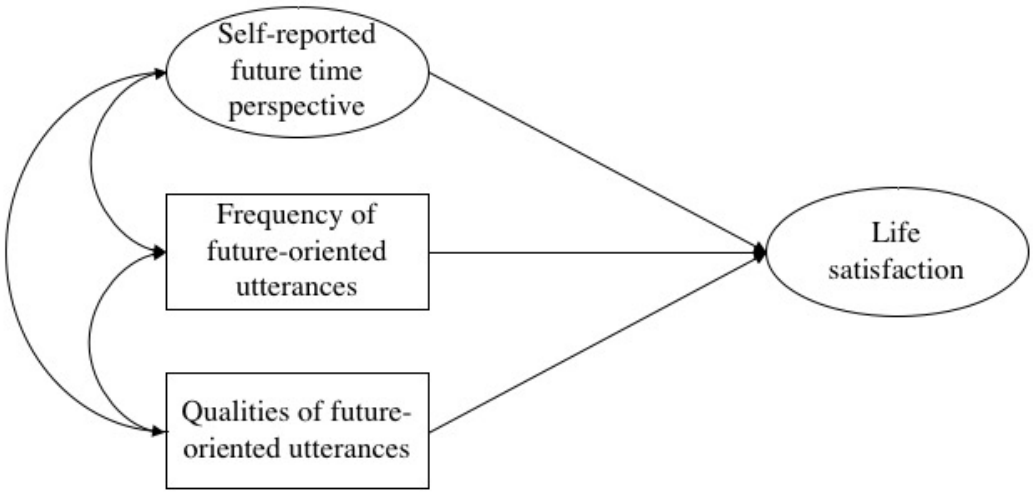


*Figure 1*. Conceptual model of predictors of life satisfaction. Self-reported future time perspective assessed via the Future Time Perspective Scale (Lang & Carstensen, 1996). Qualities of personal future-oriented utterances represent one of following six linguistic categories from DE- LIWC2015 (Meier et al., 2018): words about positive emotions, negative emotions, family, friends, affiliation and achievement. Life satisfaction assessed via the Satisfaction with Life Scale (Diener et al., 1985).

## Appendix

Table 1

*Structural Equation Model for Predicting Life Satisfaction (Four Predictors)*

| | Young | | Old | |
|---|---|---|---|---|
| | *B(SE)* | β | *B(SE)* | β |
| SWL | | | | |
| <– FTP | .605 (.219) | .362** | .315 (.079) | .624*** |
| <– F. Utt. | .118 (.029) | .468*** | -.036 (.030) | -.145 |
| <– Family | .531 (.147) | .224*** | -.039 (.102) | -.054 |
| <– Achievement | -.174 (.125) | -.212 | .140 (.075) | .259°° |
| FTP <-> | | | | |
| Family | -.030 (.040) | -.081 | .168 (.184) | .107 |
| Achievement | -.088 (.122) | -.082 | -.405 (.298) | -.195 |
| F. Utt <-> | | | | |
| Family | -.021 (.362) | -.008 | -.063 (.577) | -.020 |
| Achievement | 3.696 (1.019) | .518*** | 1.173 (.726) | .276 |

Fit indices

| $X^2(df)$ | CFI | RMSEA [90%-CI] | SRMR |
|---|---|---|---|
| 330.6 (248) | .899 | .081 (.057 -.102) | .95 |

*Note*. *B* = Unstandardized beta coefficient. *SE* = Standard error. β = Standardized beta coefficient. FTP = Future time perspective; F. Utt = frequency of future-oriented utterances; SWL = Satisfaction with life.

* $p < .05$. ** $p < .01$. *** $p < .001$. °$p = .066$. °° $p = .063$.